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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/699,190	10/31/2003	Michael D. Gandrud	P06597US0-5191	3475
34082	7590	10/17/2006	EXAMINER	
ZARLEY LAW FIRM P.L.C. CAPITAL SQUARE 400 LOCUST, SUITE 200 DES MOINES, IA 50309-2350			FRANTZ, JESSICA L	
			ART UNIT	PAPER NUMBER
			3746	

DATE MAILED: 10/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

NIT

<b>Office Action Summary</b>	Application No. 10/699,190	Applicant(s) GANDRUD, MICHAEL D.	
	Examiner Jessica L. Frantz	Art Unit 3746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 31 October 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>2/17/2004</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Information Disclosure Statement***

1. The Information Disclosure Statement (IDS) submitted on 2/17/2004 is acknowledged. The references listed therein have been considered.

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 2, 4, 8, 11, 12, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bevins (2,544,976) in view of Hitchcock et al. (US Patent Application Publication 2002/0179145). Bevins teaches the invention substantially as claimed including a positive displacement piston unit which is a pump, and therefore includes a pump, comprising a housing (10), a plurality of cylinders (22) within the housing and a piston (102) located inside each cylinder where the pistons are arranged in a radial configuration. Bevins fails to teach the inclusion of fluid passages containing electro-energized field generating elements and also fails to teach a rheological fluid is disposed within the fluid passages wherein the rheological fluid drives the cylinder and pistons. Bevins further fails to teach the viscosity of the fluid increases in the presence of a magnetic field and that the electro-energized field generating elements include an electromagnet and the piston unit further comprises an electronic controller used to control the energizing and de-energizing of the electro-energized field generating

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element where the controller selectively energizes and de-energizes the electro-energized field generating element to reduce flow of the rheological fluid through the fluid passages or that the controller energizes the electro-energized field generating element associated with one cylinder while de-energizing that of another adjacent cylinder to reduce flow of the rheological fluid through the piston unit. Hitchcock et al., teaches the inclusion of fluid passages (136, 114, 138, 116) at the top (right side of cylinder 128) and bottom (left side of cylinder 128) of the cylinder (128) that allow for the flow of fluid and the passages include an electro-energized field generating element (150, 152) and a rheological fluid (118) disposed within the fluid passages for the purpose of communicating together to effect flow rate wherein the rheological fluid drives the cylinder pistons and the viscosity of the fluid increases in the presence of a magnetic field and that the electro-energized field generating elements include an electromagnet for the purpose of receiving electrical current. (Page 1, Paragraph [0003]). Hitchcock et al. further teaches an electronic controller (122) used to control the energizing and de-energizing of the electro-energized field generating element where the controller selectively energizes and de-energizes the electro-energized field generating element to reduce flow of the rheological fluid through the fluid passages for the purpose of varying the viscosity of the rheological fluid to meet the specific requirements of the piston unit (Page 3, paragraph [0026]) and is capable of energizing the electro-energized field generating element associated with one cylinder while de-energizing that of another adjacent cylinder to reduce flow of the rheological fluid through the piston unit for the purpose of meeting the specific requirements of the piston

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system. (Page 3, paragraph [0026]). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have provided the piston unit of Bevins with the improvements provided by Hitchcock et al. including the fluid passages with the electro-energized field generating element and rheological fluid disposed within the fluid passages for the purpose of communicating together to effect flow rate wherein the rheological fluid drives the cylinder pistons and the viscosity of the fluid increases in the presence of a magnetic field and that the electro-energized field generating elements include an electromagnet for the purpose of receiving electrical current (Page 1, Paragraph [0003]); and the electronic controller used to control the energizing and de-energizing of the electro-energized field generating element where the controller selectively energizes and de-energizes the electro-energized field generating element to reduce flow of the rheological fluid through the fluid passages for the purpose of varying the viscosity of the rheological fluid (Page 3, paragraph [0026]) and of energizing the electro-energized field generating element associated with one cylinder while de-energizing that of another adjacent cylinder to reduce flow of the rheological fluid through the piston unit for the purpose of meeting the specific requirements of the piston system. (Page 3, paragraph [0026]).

Claims 1, 3, 5, 8, 9, and 11-13 rejected under 35 U.S.C. 103(a) as being unpatentable over Bevins (2,544,976) in view of Bhadra et al. (4,840,112). Bevins is discussed above and teaches the invention substantially as claimed but further fails to teach that the viscosity of the rheological fluid increases in the presence of an electric field and the electro-energized field generating element comprises an electrode and the piston unit

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further comprises an electronic controller used to control the energizing and de-energizing of the electro-energized field generating element where the controller selectively energizes and de-energizes the electro-energized field generating element to reduce flow of the rheological fluid through the fluid passages or that the controller energizes the electro-energized field generating element associated with one cylinder while de-energizing that of another adjacent cylinder to reduce flow of the rheological fluid through the piston unit. Bhadra et al. teaches the inclusion of fluid passages (56, 58, 60, 62, 64, 66) at the top (side of cylinder 28 connected to the inlet tube 56) and bottom (side of cylinder 28 connected to outlet tube 58) of the cylinder (28) that allow for the flow of fluid and the passages include an electro-energized field generating element (38, 28, 36, 30) and a rheological fluid (not labeled) disposed within the fluid passages for the purpose of communicating together to effect flow rate wherein the rheological fluid drives the cylinder pistons. Bhadra et al. further teaches the viscosity of the rheological increases in the presence of an electric field (Column 1, lines 23-25) and the inclusion of an electrode (60, 62, 64, 66) for the purpose of communicating with the rheological fluid to direct flow and thereby move the piston (42). (Column 4, lines 31-63). Also, although already included in Bevins, Bhadra et al. further includes a pump (not labeled for the purpose of providing the fluid under pressure. (Column 3, lines 28-30). Bhadra et al. further teaches an electronic controller (as shown in figure 4) used to control the energizing and de-energizing of the electro-energized field generating element where the controller selectively energizes and de-energizes the electro-energized field generating element to reduce flow of the rheological fluid through the

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fluid passages for the purpose of directing flow and thereby move the piston (42).

(Column 4, lines 31-63) and is capable of energizing the electro-energized field generating element associated with one cylinder while de-energizing that of another adjacent cylinder to reduce flow of the rheological fluid through the piston unit for the purpose of meeting the specific requirements of the piston system. (Column 4, lines 31-63). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have provided the invention of Bevins with the improvements of Bhadra et al. including the fluid passages at the top and bottom of the cylinder that allow for the flow of fluid and the passages include an electro-energized field generating element and a rheological fluid disposed within the fluid passages for the purpose of communicating together to effect flow rate wherein the rheological fluid drives the cylinder pistons. It would also be obvious to one of ordinary skill in the art at the time of the invention to allow the viscosity of the rheological fluid to increase in the presence of an electric field (Column 1, lines 23-25) and the inclusion of an electrode for the purpose of communicating with the rheological fluid to direct flow and thereby move the piston (Column 4, lines 31-63) and an electronic controller used to control the energizing and de-energizing of the electro-energized field generating element where the controller selectively energizes and de-energizes the electro-energized field generating element to reduce flow of the rheological fluid through the fluid passages for the purpose of directing flow and thereby move the piston (Column 4, lines 31-63) and of energizing the electro-energized field generating element associated with one cylinder while de-energizing that of another adjacent cylinder to reduce flow of the

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rheological fluid through the piston unit for the purpose of meeting the specific requirements of the piston system. (Column 4, lines 31-63).

3. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bevins (2,544,976) in view of Hitchcock et al. (US Patent Application Publication 2002/0179145) as applied to claims 1, 2, 4, 8, 11, 12, and 13 above, and further in view of Moutafis et al. (US Patent Application Publication 2002/0176788). The combined apparatus of Bevins and Hitchcock et al. is discussed above and substantially teaches the invention as claimed but fails to teach the pistons are arranged in an axial configuration. Moutafis et al. teaches a piston pump in an axial configuration for the purpose of making a compact flow path (Abstract). Therefore, it would have obvious to one of ordinary skill in the art at the time of the invention to have provided the combined invention of Bevins and Hitchcock et al. with the axial piston configuration of Moutafis et al. for the purpose of providing a compact flow path and pump (Abstract).

4. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bevins (2,544,976) in view of Hitchcock et al. (US Patent Application Publication 2002/0179145) as applied to claims 1, 2, 4, 8, 11, 12, and 13 above, and further in view of Hoxie (6,378,413). The combined apparatus of Bevins and Hitchcock et al. is discussed above and substantially teaches the invention as claimed but fails to teach the pistons are arranged in a bent axis configuration. Hoxie teaches a piston unit in a bent axis configuration for the purpose of increasing the range of stroke angles. (Column 1, lines 31-55). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have provided the combined invention of Bevins



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and Hitchcock et al. with the bent axis piston configuration of Hoxie for the purpose of increasing the range of stroke angles. (Column 1, lines 31-55).

5. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bevins (2,544,976) in view of Hitchcock et al. (US Patent Application Publication 2002/0179145) as applied to claims 1, 2, 4, 8, 11, 12, and 13 above, and further in view of Breveglieri (5,967,018). The combined apparatus of Bevins and Hitchcock et al. is discussed above and substantially teaches the invention as claimed but fails to teach the piston unit further comprises a hydraulic motor. Breveglieri teaches a piston unit which is a hydraulic motor and therefore, includes a hydraulic motor, and like all motors is used to convert electrical energy to mechanical energy. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have provided the combined invention of Bevins and Hitchcock et al. with the inclusion of a hydraulic motor to convert electrical energy to mechanical energy in order to provide a driving force to a system.

### ***Conclusion***

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The invention of Pohl et al. (6,149,391) provides a teaching about the usage of rheologic fluids, the way they operate, and the benefits of using such a fluid. Pohl et al. further discusses how this technology may be incorporated into a pump or a motor.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jessica L. Frantz whose telephone number is 571-272-

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5822. The examiner can normally be reached on Monday through Friday 8:30a.m.-5:00p.m. E.S.T..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ehud Gartenberg can be reached on (571) 272-4828. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JF

JF 10/11/2006



**EHUD GARTENBERG**  
**SUPERVISORY PATENT EXAMINER**